REMARKS

Claim Objections

Claim 4 stands objected to because of a misspelling in line 2. The misspelling is corrected in the foregoing amendment to claim 4.

Claim Rejections

Claims 1-10 stand rejected under 35 USC § 102(b) as being anticipated by Seguchi, U.S. Patent No. 5,917,248. Applicant, by means of the foregoing amendment has more particularly claimed the interrotor element of claim 1 to distinguish the Seguchi prior art reference. As presently amended the interrotor element comprises a magnetic and an electric circuit. The magnetic circuit includes a magnetic flux conducting cylinder and the electric circuit includes a number of circuit forming windings extending in the flux conducting cylinder. The interrotor is arranged as a conductor for the magnetic flux in tangential and radial directions such that exertion of a direct torque between the rotor and stator will occur upon magnetic saturation of the interrotor. Support for the foregoing claim limitations can be found in the specification. See in particular, page 11, line 18 - page 12, line 29. A comprehensive discussion of the distinguishing characteristics between claim 1 as presently amended and Seguchi follows.

Seguchi teaches two distinct possibilities regarding an interrotor structure.

The first possibility shown is to provide the interrotor with a permanent magnetic field using magnets (e.g. permanent magnets 1220/1420 in fig. 3). This type of interrotor allows the passage of flux in radial direction. A second possibility is to provide the interrotor with a variable magnetic field using electric circuit-forming windings (squirrel cages 1227/1427 in fig. 4). This type of interrotor does not allow the passage of flux in radial direction.

According to the invention as claimed in the foregoing amended claim 1, the interrotor is of the type having circuit-forming windings, yet specifically construed to allow the passage of magnetic flux in a radial direction. This configuration allows the rotor and the stator to exert direct torque upon each other.

The present novel configuration allows for a more compact design by using a relatively thin interrotor, and allows, for example, the possibility of operation in overdrive while the magnetic field in the whole machine maintains constant rotational speed.

The embodiment of claim 1 as amended is illustrated using the following example:

In an "overdrive" situation wherein the outgoing shaft rotates faster then the ingoing shaft, the stator acts as a generator (there exists a positive torque on the stator), while, in the same field, the interrotor acts a motor (there is also a positive torque on the interrotor). The rotor acts as a motor and experiences a negative (reaction) torque from the inner air-gap field, as is usual in a motor.

In conventional electromechanical thinking, for a rotor design featuring circuit forming windings (an induction design), the motor and generator functions can only be realized with two, opposite slip frequencies between the rotor-interrotor and the interrotor-stator.

As is evidenced in Seguchi and other prior art, this is typically realized by magnetic separation between the squirrel cage conductors 1227 and 1427 using a non-magnetic layer 1350.

However, according to the invention as expressed in amended claim 1, this type of design has been abandoned by arranging the interrotor as a conductor for magnetic flux also in radial direction, and by allowing magnetic saturation of the interrotor.

By allowing for magnetic saturation of the interrotor, the interrotor can roughly assume the magnetic behaviour of an air gap between the rotor and stator.

The concept that full magnetic saturation of the interrotor can solve the problem of magnetic interference is a break with traditional engineering in the field of electromechanical machines, where typically devices are engineered to prevent full magnetic saturation of a rotor.

In summary, in a machine with permanent magnets such as the Fig. 3 embodiment of Seguchi, the field in the machine has the same rotational speed as the interrotor. Whether a machine part operates as a motor or a generator depends on the sign of the angle between the electrically generated field and the field generated by the permanent magnets.

In a machine with an interrotor with squirrel-cage windings such as the Fig. 4 embodiment of Seguchi, the interrotor rotational speed differs from the field rotational speed (which is a basic principle of induction machines). If the field rotates faster than the interrotor, there is motor action. In the other case, there is generator action.

If a vehicle in which a machine is used operates in overdrive, the interrotor needs a positive torque. This means that the magnetic field has to rotate faster than the interrotor. If the passage of flux in radial direction is allowed, the rotational speed of the field is the same everywhere in the machine and the stator experiences a negative (reaction) torque . However, for

the principle of power split, the stator has to act as a generator and has to experience a positive torque. This is not directly possible with conventional designs. However, by giving the interrotor yoke such a width that it becomes saturated, the stator experiences an extra positive torque directly from the rotor, through the interrotor.

For the reasons set forth above, Applicant respectfully submits the claims as filed are allowable over the art of record and reconsideration and issuance of a notice of allowance are respectfully requested. If it would be helpful to obtain favorable consideration of this case, the Examiner is encouraged to call and discuss this case with the undersigned.

This constitutes a request for any needed extension of time and an authorization to charge all fees therefor to deposit account No. 19-5117, if not otherwise specifically requested. The undersigned hereby authorizes the charge of any fees created by the filing of this document or any deficiency of fees submitted herewith to deposit account No. 19-5117.

Respectfully submitted,

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